- STATEMENT OF WORK -
MARINE SOLID WASTE INCINERATOR

1. SCOPE AND ACQUISITION PLAN

1.1 Background

New techniques/technologies are required to enable US Navy ships to manage all of their solid waste at sea more effectively and with reduced total cost. The Marine Solid Waste Incinerator (MSWI) is for the destruction of solid wastes generated at sea by a large ship. This specification is based upon a definition of fleet needs, existing information on waste destruction technologies and Navy equipment integration and operational experience and knowledge. It will enable the Navy to competitively procure a shipboard waste destruction system.

1.2 Acquisition Plan

A series of contract(s) will be awarded incorporating lessons-learned from prior MSWI procurements. This initial solicitation will procure the first of four planned phases of the program: (I) MSWI COTS Design and a combustion demonstration test of burning the Navy shipboard waste, see section 3.1, (II) Modifying the COTS Design to meet all Navy requirements, (III) First Article and Initial Production Manufacture, and (IV) Production Manufacturing. The Project will be awarded in phases to verify the capability of the contractor's equipment design prior to committing to equipment production. The first contract resulting from the solicitation may have multiple awards. The contractors for Phase II will be "down selected" based on the submitted designs and the test performance of the contractors awarded the Phase I contract(s). Only the contractor(s) selected for the Phase I contract(s) will be eligible to be considered for award of the Phase II contract(s), which will be to modify the COTS design to meet the unique Navy requirements. In a further "down select", only the contractor(s) who are successful in delivering acceptable Modified COTS designs during Phase II, will be considered for award of Phase III, the First Article production units. In a final "down select" only the contractor(s) who are successful in the First Article production units in Phase III will be considered for award of Phase IV, the full scale production.

1.3 Contract Scope for Phase I Design and Proof of Concept

This contract is for the Phase I design of a MSWI that can burn the high specific heat waste that is generated aboard Navy ships, the system's initial logistics, and design information to support the installation aboard USS NIMITZ (CVN 68) Class and CVN21 Class Aircraft Carriers. This Phase I contract also requires a performance test to verify that the proposed design can be used to burn high specific heat waste such as plastic and oily rags. The MSWI shall be based on proven, commercial off-the-shelf (COTS) equipment that has been modified and/or integrated to meet the applicable requirements described herein. The MSWI design shall include all equipment, controls, structure, special tools and equipage associated with processing a USS NIMITZ Class Aircraft Carrier's solid waste stream. This processing shall include waste feeding, pre-processing, destruction, byproduct management (such as ash removal), and exhaust gas treatment that is essential to meet the requirements described herein. The system shall limit the use of consumables and require minimal manpower for operation and maintenance. The system's ability to meet US Navy shipboard operations shall be evaluated.

2. APPLICABLE DOCUMENTS

2.1 General

The documents listed below are cited in this specification. In each case, the latest version or revision shall apply. They do not constitute a comprehensive list of waste

destruction system design specifications, but are used herein to define requirements that may be above and beyond existing manufacturing practice. They shall be followed as described within this specification and to the extent that they define best commercial practice.

2.2 Government Specifications, Standards, and Handbooks

The latest versions of the following specifications, standards, and handbooks shall be used by the offeror as background and guidance, either mandatory or optional, to meet the military requirements described in this specification.

2.2.1 Department of Defense

MIL-STD-167-1 – Mechanical Vibrations of Shipboard Equipment (Type I- Environmental and Type II – Internally Excited) (Guidance)

MIL-STD-461 - Control of Electromagnetic Interference and Emissions and Susceptibility, Requirements (Guidance)

MIL-STD-462 - Measurement of EMI Characteristics (Guidance)

MIL-STD-777(SH) – Schedule of Piping, Valves, Fittings, and Associated Piping Components for Naval Surface Ships (Mandatory)

MIL-S-901 - Grade B Shock Requirements for Shock Tests, Shipboard Machinery, Equipment, and Systems (Mandatory)

MIL-STD-882 – System Safety Program Requirements (Mandatory)

MIL-STD-1399 – Interface Standard for Shipboard Systems (Guidance)

MIL-HDBK-470 – Maintainability Program Requirements for Systems and Equipment (Guidance)

MIL-HDBK-781 – Reliability Test Methods, Plans and Environments for Engineering Development, Qualifications, and Production (Guidance)

OPNAVINST 5090.1B Change 1, Environmental and Natural Resources Program Manual Department of Navy, Office of the Chief of Naval Operations, Washington, DC 203050 (Guidance)

NAVSEA publication “Metric Guide for Naval Ship Systems Design and Acquisition” dated June 1995 (Guidance)

NAVSEA publication “Shock Design Criteria for Surface Ships, NAVSEA 0908-LP-000-3010, Revision 1”, dated September 1995 (Mandatory)

NAVSEA S6470-AA-SAF-10 Gas Free Engineering Program

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094)

2.2.2 Other Government Documents, Drawings and Publications

None

2.3 Commercial Specifications

2.3.1 AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM F1166-95a	Standard Practice for Human Engineering Design for Marine Systems, Equipment and Facilities (Mandatory)
ASTM D-4541 - 85(89)	Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers (Mandatory)
ASTM D-3359 -97	Standard Test Methods for Measuring Adhesion by Tape Test (Guidance)

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

2.3.2 INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 45-1998 Recommended Practice for Electric Installations on Shipboard (Mandatory)

(Application for copies should be addressed to the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331.)

2.3.3 INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 6954 (15 December 1984) Mechanical Vibration and Shock Guidelines for the Overall Evaluation of Vibration in Merchant Ships. First Edition (Mandatory)

(Application for copies should be addressed to the International Organization for Standardization, Case Postal 56, Geneva, Switzerland CH-1211.)

2.3.4 AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME Y14.100M-1998: Engineering Drawing Practices (Guidance)

ASME Y14.5M-1994: Dimensioning and Tolerancing (Guidance)

(Application for copies should be addressed to ASME International, Three Park Avenue, New York, NY 10016-5990)

2.3.5 STEEL STRUCTURES PAINTING COUNCIL (SSPC), Pittsburgh, PA, USA

SSPC-SP10 (or NACE No. 2): Joint Surface Preparation Standard, Near-White Blast Cleaning (Guidance)

(Application for copies should be addressed to the Steel Structures Painting Council, 40 24th Street, Suite 600, Pittsburgh, PA 15213 USA Phone: 412-281-2331 Fax: 412-281-2331, Email: research@sspc.org)

2.3.7 SOCIETY OF NAVAL AND MARINE ENGINEERS

SNAME T&R Bulletin No. 3-37 Design Guide for Shipboard Airborne Noise Control (Mandatory)

(Application for copies should be addressed to SNAME, 601 Pavonia Ave., Jersey City, NJ 07306)

2.4 Order of Precedence

In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless the contractor has obtained a specific exemption from the Government by way of the Contracting Officer.

3. DESIGN REQUIREMENTS

The requirements described below define the MSWI design and installation specifications.

3.1 Phase I Requirements.

For Phase I, the contractor shall provide the design of a Commercial-Off-The-Shelf (COTS) incinerator that will fit in the available compartment, burn the specified waste at the specified capacity, and incorporate the required waste feeding and ash removal systems. It shall also meet the balance of the specifications as completely as possible. The intent is for the contractor to provide all engineering details of the manufacturer's COTS system (with options as needed) that best meets the specification. The manufacturer may choose to make minor changes to the design or to scale up or scale down from a "standard" model to best meet the requirements. The contractor shall also provide a detailed proposal of how they plan to meet all of the requirements for the Phase II design. This plan shall include the teaming or subcontracting plan to provide the expertise needed to meet the Navy shock, and vibration, safety and reliability studies. This plan shall also clearly state if any of the requirements will not be met by the anticipated Phase II design. The Navy will determine whether a waiver will be allowed for those items. If a waiver is not granted prior to the contract award for Phase II, all requirements will be in force for Phase II, III, and IV.

For Phase I, the contractor shall arrange for a demonstration of the burning of the Navy Waste compositions in a similar incinerator. This incinerator will not be purchased by the Navy and may be owned by the manufacturer or one of the manufacturer's other customers. The intent is to verify that the incinerator design is capable of meeting the combustion requirements stated below. Previous observations have noted that the burning of high heat waste such as 100% plastic or 100% oily rags is difficult in incinerators that are normally designed to burn lower heat wastes such as MARPOL Type 2. This test will be witnessed by Navy personnel and Navy contractors. These Navy contractors are experienced in ship equipment, integration, and waste issues; and are independent from other incinerator companies. The test shall be conducted at a site chosen by the contractor and may be either land based or shipboard. The following test requirements apply:

A. Test of an incinerator with a capacity of not less than 50% of the Phase I Design's thermal load (34 MBTU/Day) under all waste compositions. The test durations shall be 8 hours minimum, or the minimum design daily operating time per the proposal, whichever is longer. Four days of testing at this capacity and duration shall be performed. The tests shall be conducted at the test incinerator's full capacity. The following waste compositions (using the typical waste components in tables 3A through 3F) shall be loaded and burned for at least 1 hour or until steady state is reached during each of the 4 days of testing:

1. 100% plastic.

2. 100% lightly contaminated (10% oil by weight) oily rags.
3. 100% dry rags, wood, heavy cardboard.
4. MARPOL Type 2 waste mixture, limited to 25% of the total test duration.
5. At least 3 other mixtures of various waste types, all of which shall include plastics and oily rags.
6. The waste compositions shall be changed quickly during the test to observe how the controls respond and the operator interaction required

B. Waste feeding shall be at the maximum rate (feed system kept full) for two, one-hour periods during each test, limited only by the system's automatic controls (this will test the system's capability to control the feeding when the sailor intentionally tries to overfeed the system). This test period shall not take place when burning the MARPOL Type 2 mixture.

C. Ash removal shall be performed using a system similar to the proposed system. Ash removal to be performed per the vendor's procedures, except that Navy confined space rules per NAVSEA S6470-AA-SAF-10 Gas Free Engineering Program apply. Specifically, the operator shall not reach into or break the plane of any confined space at any time.

D. The contractor shall continuously record chamber and stack temperatures, emissions parameters (opacity, carbon monoxide), weights for each load, and other information.

E. The contractor is responsible for the entire cost of the demonstration test, including, but not limited to: labor to load, operate, and maintain the incinerator; waste delivery; ash removal; support services and utilities; test equipment; contractor and manufacturer's travel to the test site; test site preparation; permits; and the test incinerator and its installation.

F. The contractor shall provide the test schedule and test plan 5 weeks prior to the test date to allow for Navy review and approval, and to provide sufficient notice for arranging the travel.

G. The Navy will be responsible for the labor, travel costs, and incidental expenses of the Navy personnel and Navy contractors witnessing the test. In the event that the test is conducted at-sea, the Navy personnel and Navy contractors are to be provided quarters similar to those of the crew or service representatives and will reimburse the ship at the daily rate for the quarters and food charged to service representatives for other shipboard equipment.

The down select at the end of Phase I will evaluate the COTS design, the Plan for Phase II, whether any waivers of requirements are requested, and the demonstration test results. The down select will choose one or more of the contractors that best demonstrate the ability to meet the requirements in this specification, which is the best value to the Government. Note that the Government reserves the right to not award any contracts for Phase II if the Phase I evaluations show that the systems do not demonstrate sufficient ability to meet the Phase II requirements or if there is a change in the Navy's needs or funding.

3.2 Phase II Requirements

For Phase II, the contractor shall modify the design of the Phase I COTS incinerator to meet all of the requirements of this specification, unless waivers are granted. The contractor shall team or subcontract with companies that have the expertise to perform the shock, vibration, safety, and reliability studies to meet the specifications. Past experience has shown that the shock and vibration requirements dictate that the system will be built much

stronger than commercial shipboard or land based equipment. Past experience also shows that the equipment manufacturers do not have this capability in-house due to the specific analysis techniques required.

The down select at the end of Phase II will evaluate each Modified COTS design and measure how well it meets the specifications, which is the best value to the Government. Included in this evaluation is the successful analysis of the system for shock, vibration, safety, and reliability. The results of the combustion demonstration from Phase I will also be factored in. Note that the Government reserves the right to not award any contracts for Phase III if the Phase II evaluations show that the systems do not demonstrate sufficient ability to meet the Phase II requirements or if there is a change in the Navy's needs or funding.

3.3 Phase III Requirements

For Phase III, the contractor(s) selected shall build one first article incinerator based on the Phase II design. The Government will perform land based testing to verify performance. The Government may also perform ship based testing. If two or more Phase III contracts are awarded, a final down select for production will be performed based on the results of the land based and ship based testing.

3.4 Phase IV Requirements

For Phase IV, the selected contractor shall build incinerators as needed. Generally, this would be at a rate of 1 or 2 per year until the fleet needs are met.

3.5 Ship Integration

The contractor shall design the MSWI for installation aboard CVN21 and NIMITZ Class aircraft carriers. Final space selections have not been made at this time by the US Navy and will only be made when system selection is made. Drawings showing the dimensions for the spaces proposed for USS NIMITZ Class ships are attached as Figure 1 and those for CVN21 Class are shown in Figure 2. The bulkheads and space heights shown on Figures 1 and 2 cannot be removed to accommodate this design. Penetrations through decks and bulkheads are allowed, but will be limited as identified on the Figures. The design can use any or all of the space provided. The system weight and space shall be minimized, but not at the cost of performance, operability, reliability or maintainability. The maximum sizes and goals for the incinerator are provided in Table 1. They are based on a compartment size of 224 inches x 160 inches x 93 inches high, and the requirement for a walkway 18 inches all around for access and maintenance. In addition, an additional 6 inches all around and 2 inches on the top are reserved for additional structure to meet the Phase II shock and vibration requirements. Proposed systems that are larger than these dimensions will be carefully evaluated for operation and maintenance access and may be eliminated from consideration due to the size. Regardless of the incinerator dimensions, the entire system shall be capable of being operated and maintained without exceeding the compartment dimension.

Table 1. Incinerator Sizes

Size	Compartment	Phase I COTS Design Goal	Phase I COTS Design Maximum	Phase II MCOTS Design
Length (inches)	224	150	168	180
Width (inches)	160	80	112	124
Height (inches)	93	90	90	92
Weight		30,000	40,000	

Figure 1. CVN 68 Class Incinerator Compartment

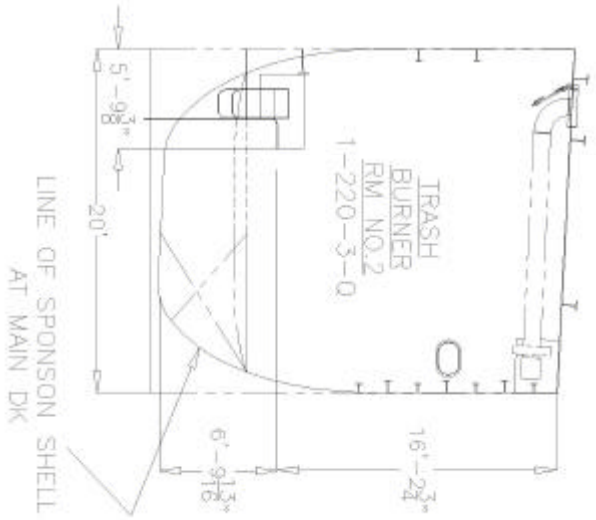
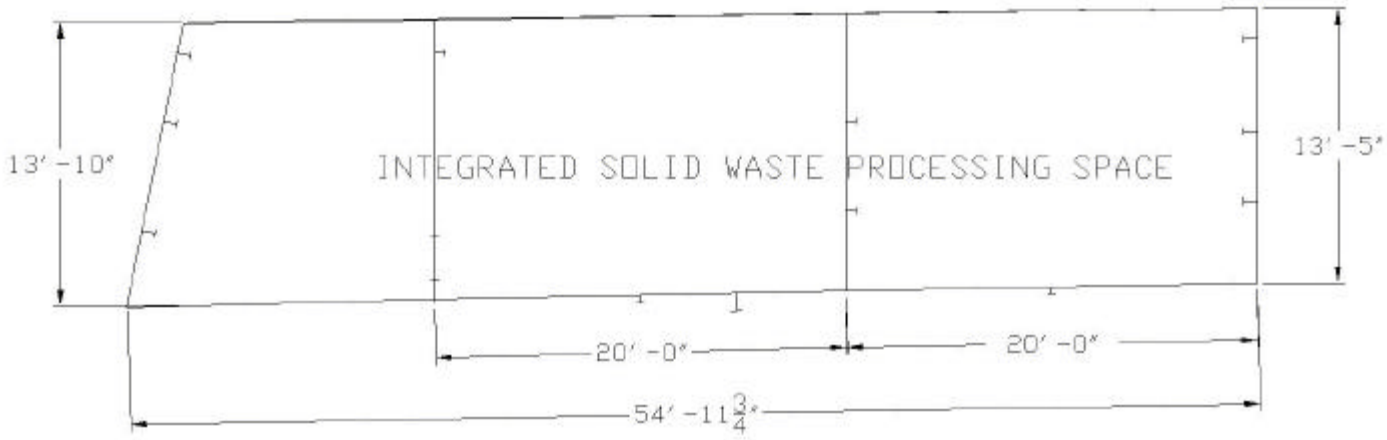


Figure 2. CVN 21 Integrated Waste Handling Compartment



The MSWI system shall be capable of being operated under normal shipboard conditions and motions, including a roll of up to 10-degrees in any direction, with an event duration of 10-20 seconds. The operation of this system shall in no way interfere with any other shipboard operation.

The dry weight of the COTS system for Phase I shall be no more than 40,000 lbs. This weight includes all equipment specified herein, any auxiliary equipment needed for system operation, internal piping, and internal wiring. It is anticipated that this weight will increase during Phase II due to the additional structure required to meet the shock and vibration requirements. The weight of the foundations, piping and wiring that connect the equipment to the ship services, waste, ash, and water are not included in the above weight.

The location of the system within the ship requires that the exhaust be discharged a long distance away horizontally to prevent re-ingestion at ventilation intakes or weather deck areas. The system shall be designed to operate with a horizontal exhaust length of 150 to 250 feet with at most 10 feet of vertical rise. As a result, a fan or other device must be provided to move the exhaust gas from the system. The system must also be able to safely tolerate an emergency shut down or loss of utilities with this exhaust configuration.

3.6 Compatibility with Ship's Services

The MSWI shall not require shipboard services other that the following, which are available to the extent described below. The contractor shall provide the auxiliary equipment required to condition these services to meet the requirements of any portion of their system. The contractor shall provide any additional services that any portion of their system requires.

- Electrical Power - 440V, 60-Hz, 3-phase, less than 120 KW full load
- JP-5 (kerosene) liquid fuel. A day tank will be supplied by the installer.
- Seawater - 300 GPM maximum, 100 to 180 PSIG (will vary over time depending on other ship systems and installation location), 40-100 deg F (will vary depending on where the ship is operating). The contractor shall provide the strainer size that is required for proper equipment operation and service life.
- Fresh Water – 60 PSIG up to 5 GPM; 70?F, total usage shall be less than 10,500 gallons/day under all operating conditions. The goal for fresh water usage is 0 gallons per day.
- Ship service compressed air at 80 PSIG, 10 scfm maximum (Air supply to the space at a maximum temperature of 90°F with a wet bulb temperature of 81?F, unlubricated, and unfiltered).
- Process and ventilation air at 0-100?F, not heated or air conditioned, potentially salt laden).

The contractor shall provide a list of all ship services and their capacities required for their proposed system as part of the proposal.

3.7 Waste Stream Processing Capability

The MSWI shall be capable of safely and completely processing any combination of the wastes shown in Table 2. Waste classes 1-15 will normally be processed by the system. These wastes have a higher specific heat content (btu/pound) than is typical for incinerators. As a result, the capacity of the system shall be 34,640,000 BTU per day of high heat content waste. The contractor shall produce an operational analysis that shows the system can process the waste at this rate. This analysis shall include all operational functions including start-up, feeding, shutdown, clean up and maintenance. The system shall be capable of processing the day's waste at this average rate, regardless of the mixtures delivered to the incinerator.

3.7.1 Waste Stream

Individual batches of waste may consist of either a single type of waste or a mixture of waste categories. Subsequent waste batches will vary randomly. Much of the waste material

will be delivered in 30 – 50 gallon bags, which may be made of either paper or plastic. The waste can range from completely dry to slightly wet with oil (10%) to very wet (>90% by weight) with food wastes. Cardboard will be delivered to the MSWI broken down into large flat rectangles. The largest cardboard boxes that maybe delivered to the system are "tri-walls" (triple thickness corrugated cardboard) which are approximately 4 feet long on a side when assembled. Wood pieces will be delivered in sizes and shapes that facilitate transport by hand, but up to a full pallet in size. The system shall be able to process without any sailor modification plastic containers up to 5 gallons in capacity. Tables 3A through 3F list the form of the various combustible wastes. A thermal energy balance shall be provided to verify the MSWI is capable of processing this quantity of waste and that the system can manage to process, without sailor intervention, any spikes in waste streams, no matter how significant, in compliance with all other system requirements (i.e. exhaust CO and Opacity and all MARPOL operating parameters within limitations). The MSWI shall be able to process the following combinations of wastes with no manual adjustments by the operator:

1. 100% plastic for over 1 hour or until steady state is reached.
2. 100% lightly oiled (10% oil by weight) rags for over 1 hour or until steady state is reached.
3. Wood and heavy cardboard for over 1 hour or until steady state is reached.
4. Varying mixtures of plastic, rags, wood, and heavy cardboard for over 1 hour or until steady state is reached.
5. MARPOL Type 2 waste for over 1 hour or until steady state is reached.

Table 2. CVN 21 Design Waste Generation Rate

CVN 21 Design Waste Generation Rate for 5,500 sailors embarked											
STENNIS Composition augmented with NIMITZ, CAMDEN, and Rag Waste Data, pro-rated to the Green book rate, augmented with STENNIS, NIMITZ, CAMDEN, and Rag Waste Data (3.2 lb/sailor/day)											
Revised: 8 September 2003											
Waste Class	Waste Composition	Generation Rate (kg/day)	Generation Rate (lb/day)	As received (kcal/kg)	As received (btu/lb)	Heat Release (btu/day)	Cumulative heat release *btu/day)	Cumulative Generation Rate (lb/day)	Cumulative Average (btu/lb)	Total Heat Release (kcal/day)	Total Heat Release (kW-hr/day)
1	Oily rags	250	551	6,563	11,802	6,503,031	6,503,031	551	11,802	1,640,314	1,907
2	Non-oily rags (old clothes)	42	92	3,572	6,424	590,964	7,093,995	643	11,033	149,064	173
3	Paint rags	14	30	4,346	7,815	234,462	7,328,457	673	10,889	59,140	69
4	Dunnage (textiles)	6	14	3,572	6,424	89,929	7,418,386	687	10,798	22,684	26
5	Dunnage (wood)	50	110	3,567	6,415	705,598	8,123,985	797	10,193	177,979	207
6	Wood	26	57	3,567	6,415	365,628	8,489,613	854	9,941	92,225	107
7	Heavy cardboard	1,157	2,550	3,509	6,310	16,091,086	24,580,699	3,404	7,221	4,058,790	4,719
8	Wax coated carboard	77	170	5,547	9,975	1,695,778	26,276,476	3,574	7,352	427,740	497
9	Wax paper	54	118	4,087	7,350	867,258	27,143,735	3,692	7,352	218,756	254
10	Kimwipes	27	59	3,509	6,310	372,304	27,516,038	3,751	7,336	93,909	109
11	Food contaminated plastic	305	672	10,465	18,819	12,646,499	40,162,537	4,423	9,080	3,189,933	3,709
12	Non food contaminated plastic	192	423	10,957	19,704	8,334,774	48,497,311	4,846	10,008	2,102,350	2,445
13	Incidental plastics	2	6	8,251	14,838	89,027	48,586,338	4,852	10,014	22,456	26
14	Dunnage (plastic)	19	41	10,957	19,704	807,862	49,394,200	4,893	10,095	203,774	237
15	Cigarrette butts & sweepings	28	61	2,617	4,706	287,075	49,681,275	4,954	10,029	72,411	84
16	Bones and shells (pulper residuals)	8	18	0	0	0	49,681,275	4,972	9,992	0	0
17	Light cardboard	308	680	3,509	6,310	4,290,956	53,972,231	5,652	9,549	1,082,344	1,259
18	Paper	2,599	5,730	3,132	5,632	32,272,914	86,245,145	11,382	7,577	8,140,469	9,465
19	Fuel filters	0	0	6,899	12,406	0	86,245,145	11,382	7,577	0	0
20	Cloth lifting straps	0	0	3,572	6,424	0	86,245,145	11,382	7,577	0	0
21	Medical waste (infectious)	7	17	0	0	0	86,245,145	11,399	7,566	0	0
22	medical waste (plastic)	20	44	10,957	19,704	866,974	87,112,119	11,443	7,613	218,684	254
23	medical waste (paper/cardboard)	20	44	357	642	28,248	87,140,367	11,487	7,586	7,125	8
24	medical waste (metal/glass)	2	6	0	0	0	87,140,367	11,493	7,582	0	0
25	Food (minus nonpulpable items)	1,669	3,680	998	1,795	6,604,503	93,744,870	15,173	6,178	1,665,910	1,937
26	Metal/glass	1,091	2,404	0	0	0	93,744,870	17,577	5,333	0	0
27	Dunnage (metal)	50	110	1,504	2,705	297,511	94,042,381	17,687	5,317	75,044	87
	Total	8,023	17,687			94,042,381				23,721,102	27,582

Table 3. Some Examples of the Forms of the Waste

Table 3A. Paper

Material	Form
Office Paper	Whole Sheets (8 ½ x 11)
Paper Towels	Sheets
Kimwipes	Nylon Net Reinforced, Single Sheets

Table 3B. Cardboard

Material	Form
Light Cardboard	Cereal Boxes
Heavy Cardboard	Corrugated
Coated Cardboard	Milk Cartons, Pringles & Cheese Ball Canisters
Wax Paper	Single Sheets
Tri-walls	Broken down to 4’x4’ Sheets

Table 3C. Plastic

Material	Form
Polystyrene	Foam Coffee Cups Utensils
0.5-2.0 mil LDPE	Film
HDPE	Milk Jugs and 5 Gallon Pails
PETE	Soda Bottles and Salad Dressing Bottles

Table 3D. Wood

Material	Form
Pallet	Whole
Plywood	2’x4’x1”
1X Lumber	4 ft

Table 3E. Cloth

Material	Form
Rags	Cotton or Blends
Dungarees	Non-Shredded with Buttons and Zippers (Plastic or Metal)

Table 3F. Metal/Glass

Material	Form
Metal	Aluminum Soda Cans, #10 Steel Cans, Metal Banding Straps
Glass	Jars to 1 Gallon
1X Lumber	4 ft

3.7.2 Waste Stream Incidental Items

Sailors will be instructed to source separate their waste to keep metal and glass containers, hazardous and flammable materials and other non-combustible items out of the MSWI. Incidental items listed in Table 4 may still be accidentally or inadvertently delivered to and loaded into the MSWI system. The listed items are expected to be relatively few in number, but potentially disruptive to MSWI performance. The items listed are representative of the broad range of materials that have historically been found in waste delivered to the existing Navy waste treatment systems. The MSWI system shall be designed to safely tolerate these items without endangering the operators or equipment if they are accidentally introduced.

Table 4. Typical Incidental Items

5/8 in. Diameter x 3 in. Hardened Bolts
Schedule 40 Pipe from 1/8 to 3 Inch Diameter
Steel Wire No. 20 to No. 0
Stainless Tableware (forks, knives, spoons, etc)
Steel Cable Up To 1/2 in. Diameter
Coat Hanger
Nails and Screws
Disposable Cigarette Lighter
Steel Toed Work Boots
Aerosol Can (Nearly empty to full)
Disposal Batteries of Various Sizes (alkaline and lithium)
Glass Bottles
Steel and Aluminum Cans
Electrical Wire and Cabling No. 22 to No. 10
Padlocks
12-in. long steel wrench

3.8 Waste Feed System

The MSWI feed system shall be designed to be operator friendly and intrinsically safe. The feed system shall include all hoppers, trash chutes, size reduction devices, metal/glass separators, conveyors, augers, mixers, valves, metering devices, heaters, etc. required to take the waste from the sailor’s hands to the destruction stage of the processing. It shall reliably feed, pre-process and manage the target waste. It shall be resistant to bridging, jamming or damage, even when processing waste listed in Table 4. The contractor shall list any materials that their system cannot safely process and the reason why. This list will be carefully considered and will be used as part of the evaluation for the proposal and the down select for Phase II. The waste feed system shall meet the following requirements:

3.8.1 Operating Personnel

The number of operators required for preparing and feeding of the waste shall be minimized (see paragraph 3.17).

3.8.2 Waste Segregation

The system shall not require the operator to segregate the waste prior to loading into the waste feed system. The vendor shall provide any separation equipment needed for its system design (if necessary).

3.8.3 Waste Sizing

The systems shall not require the operator to manually reduce the size of the waste prior to loading into the waste feed system as long as it is less than the sizes presented above (see paragraph 3.7.1) except as follows:

1. Pallets will be broken into individual boards.
2. Heavy cardboard will be cut to no larger than 4′ x 4′ and folded once to be 2′ x 4′.
3. Plywood will be cut to no larger than 2′ x 4′.

Therefore, the opening of the waste feed system must allow the following to be directly fed:

1. Wood boards up to 4 feet long
2. Cardboard up to 2 feet wide x 4 feet long x 6″ thick
3. Plastic buckets and bottles up to 5 gallons
4. Bagged waste up to 30 gallons
5. Boxed waste up to 18 x 18 x 24 inches

3.8.4 Feed System Overloading

The feed system or mechanism design shall prevent the MSWI from being overloaded with waste to a magnitude at which the control system cannot maintain the destruction process within allowable limits as defined in paragraph 3.11.1.

3.8.5 Feed System Cleaning

The feed system's design shall permit sufficient self or sailor performed cleaning to guarantee that waste residues will not cause fire hazard, odor, health or habitability problems.

3.8.6 System Cleaning

All equipment shall be designed to allow wash-down with a freshwater garden hose, except the interior of the incinerator combustion chambers. Complete cleaning in accordance with these requirements shall not take longer than 30-minutes, once per day. Liquids shall drain from the equipment through a strainer and shall be sent to the ship's gray water system. The contractor shall supply stainless steel screen with 1/4 ″ diameter perforations, a quick opening door for cleaning the screen, and drain valves. During normal operation, the drain valves will be closed and the liquids shall be treated in the incinerator.

3.8.7 Feed System Strength

The feed system shall be resistant to damage from operator carelessness (e.g. bumping into components with a trash can or stepping on components that make convenient steps).

3.8.8 Feed System Controls

The feed system controls shall be of a failsafe design that minimizes the possibility of secondary failures or unsafe conditions. The risk of fire within the feed system shall be mitigated and, if required, internal fire suppression shall be included. The design shall prevent the propagation of dust, smoke or fire into the environment due to any changes in

internal pressure, other portions of the MSWI, or a feed system failure. The system's proper and timely response to component failures, power failures, or events that degrade feed system performance shall not rely upon operator action, but upon control logic and failsafe hardware design.

3.8.9 Feed System Airlock

Some sort of double door or other airlock between the feed system and thermal destruction section shall be provided to prevent hot gases or flames from reaching the operator or any waste storage device.

3.8.10 Feed System Liquid Handling

The system shall be designed to contain and manage all liquids contained within the waste stream and/or generated during the pre-processing. These liquids shall be treated within the incinerator.

3.8.11 Feed System Interlocks

The feed system shall be designed to prohibit, physically and through control interlocks, the access to any hot, rotating or moving machinery. Interlocks shall prevent the operator from feeding the system until it is ready to receive waste and will not allow the waste into the destruction chamber until the system has reached the proper operating conditions (temperature, pressure, etc.). Also, the feed system interlocks shall not cause any shutdown of the destruction process. Destruction system interlocks are described in paragraph 3.9.1 and 3.12.

3.8.12 Feed System Ventilation

If the feed system includes a shredder or other waste sizing device, the shredder shall be kept at a negative pressure at all times; isolated from the combustion chamber using an airlock; shall be vented overboard at a rate of 8 cfm for every cubic foot of shredder and feed system volume, up to the airlock; have latches to keep the door shut in the event of an explosion; and an electrical interlock to stop the shredder motor when the door is not closed and latched. The vent shall include a filter to prevent the discharge of dust overboard.

3.9 Destruction Chamber(s)

3.9.1 Process/Temperature Control.

The MSWI system shall automatically control the destruction process to maintain efficient operation and protect internal components from damage. The automatic control shall not require any operator feedback other than commands for process startup, emergency or normal shutdown, waste feed initiation, ash removal initiation, and maintenance/ troubleshooting. The destruction technology must allow processing of all combustible shipboard waste, in any combination of waste mixes based on the values in Table 2, within the 24 hour period (including maintenance, repair and cleaning downtime), while maintaining emissions requirement as described in section 3.11.1. Calibration of all sensors and gauges shall not be required more often than once every 5,300 hours.

3.9.2 Operator Interface

Operation of the MSWI shall not allow operators to be directly exposed to the destruction chamber(s) or to radiant, convected or conducted heat from the destruction chamber(s). In addition, the operation shall not require manual stoking or raking of materials while they are in any portion of the MSWI.

3.9.3 Process Gas

The system design shall limit and safely contain flammable process gas that is generated at any point in the destruction process. The system shall consume the process gas as it is generated (no storage). No more than 1,000 cubic feet of flammable gas shall be in the system at any time.

3.9.4 Destruction Chamber Pressure

The combustion chamber and all devices attached to it shall be air tight to an internal pressure of 0.25 psig to prevent exhaust products from entering the compartment in the event of a utility failure or loss of draft control.

The design of the destruction chamber pressure control system must maintain a negative pressure at all times during the destruction process (including the waste feed cycle) to prevent combustion gasses from entering the compartment.

If conditions result in positive pressure for more than 1-second, then the controls shall take whatever steps are required to quickly (within 10-seconds) return to negative conditions. When proper pressure has been restored, the system shall then automatically return to normal operation. If the system does not return to negative pressure within 10 seconds, the system alarm shall be activated and a controlled automatic shutdown shall be initiated.

The combustion air for the incinerator shall be supplied from the exterior of the ship via a sealed duct (duct to be supplied by the installer). This duct shall be designed to withstand any high temperature condition caused by the failure of the draft control system or the system utilities. Under no circumstances shall the exhaust or process gas be allowed to exit the system within the hull of the ship. In this case precautions shall be made to completely shut off all sources of destruction air and prevent seepage of process gas or exhaust gas into the compartment.

A system to allow for rapid cessation of the destruction process in the case of loss of draft is highly desirable.

The design of the system shall be such that no MSWI components will be damaged as a result of loss of draft control.

3.10 Combustion By-Product Management

3.10.1 Combustion By-Product Requirements

It is expected that the MSWI will generate some by-products during the destruction process. This by-product frequently takes the form of ash and slag and other residual undestroyed wastes. The bottom ash shall contain less than 10% unburned residue by weight.

3.10.2 Daily By-Product Collection and Handling

The MSWI shall provide for the safe collection, removal, storage, and disposal of both bottom and fly ash with minimal interference to the destruction process, and within the 24-hour period. The incidental introduction of metal or glass into the MSWI shall not negatively impact MSWI operation, maintenance or the ash removal processes (with the exception of slightly longer ash removal times). The process for the collection and removal of bottom and fly ash or slag shall be automatic or, at most, require minimal operator interaction (where such interaction is limited to “pushing buttons” on the control panel and removing ash containers when they are full). The MSWI architecture and the ash containers

shall not require exposure of the operator to temperatures above 140 °F, ash, hazardous gases, or other MSWI by-products during the process of transferring ash or slag into a container for storage or disposal. If stored, the ash and/or slag will be transferred to and stored in metal containers. The vendor shall propose the size/shape of the containers, subject to approval by the Government. The temperature of the by-product being transferred to the ash container shall be less than 400°F. The stack fan shall be operating whenever by-products are being removed to ensure that all ash that becomes airborne does not enter the compartment.

Any ram or other device used to stir, move or remove waste or by-products in the MSWI shall be sealed to prevent the propagation of smoke or fire outside of the system into the compartment. The devices shall be designed to meet the mean time between critical failure (MTBCF) requirements in Section 3.11.3. In addition, the MSWI destruction chamber(s) design shall permit sufficient internal cleaning to guarantee that waste residues will not cause fire hazard, odor, health, or habitability problems.

Sufficient doors, access ports, view ports, and special tools shall be provided so that the operator can inspect and clean the destruction chambers without entering a “confined space” as defined by NAVSEA S6470-AA-SAF-10 Gas Free Engineering Program. In addition, the doors shall have a latch sufficient to contain an explosion of a 14 oz propane container and sealed to maintain system pressure (vacuum) under normal operation and emergency shutdown.

3.10.3 Periodic By-Product Management

By-products that remain within the destruction chamber(s) will have to be removed manually on a periodic basis. This includes waste that may hideout in corners of the system, large items that the automatic system cannot manage and other products that may stick to the walls of the destruction chamber. The MSWI shall be designed to not require this cleanout more than once every 14 days, and if possible, not within a seven-month deployment. Any incidental ash that is not automatically removed from the chambers by the automatic ash removal equipment shall not interfere with combustion at the rated capacity for a period of no less than 14 days between manual clean outs.

The destruction chamber shall be designed so there shall be no obstructions around any access panels or doors that can cause accidental exposure of maintenance personnel to ash either directly or through the air or interfere with the by-product removal process. The flue gas fan shall be in operation whenever by-products are being removed to ensure that all ash that becomes airborne does not enter the compartment.

3.11 Exhaust Gas Treatment and Emission Requirement

3.11.1 Emission Requirements.

The MARPOL Annex 6 Emissions limits and operating parameters and the emission requirements listed in Table 5 shall be met when processing all combinations of combustible shipboard waste and for all potential operating scenarios. Possible operating scenarios include; the feeding of subsequent batches of the highest and lowest possible heat values, and feeding at any rate up to the maximum that the MSWI system control allows. The control system shall reduce or stop the feeding of waste automatically to maintain the emissions values below the limits. Interlocks and/or automatic controls shall be provided to minimize MSWI emissions while initiating an automatic shut down of the system and/or if the exhaust system is not functioning properly.

Table 5 MSWI Emission Requirements

Type of Emission	Limit

CO	100 ppmv **(corrected to 7% O_2)**
Opacity (average)	10%

3.11.2 Temperature Requirement

The exhaust gas shall be rapidly cooled to less than 400°F within 2.5 meters of the combustion chamber outlet, to minimize the generation of dioxins and furans. The exhaust as it leaves the ship shall also be less than 400°F.

3.11.3 Exhaust Plume

The system shall include any equipment necessary to prevent a visible steam plume of more than 10% opacity, including the water droplets, from the output stack when the outside ambient temperature is at 32°F (0°C), with a seawater temperature of 40°F (4°C).

3.11.4 Burning Embers, Sparks, and Fly Ash

Under all normal operating conditions the exhaust stack shall not emit any burning embers, sparks or more than 0.2 grains/dry standard cubic foot of fly ash particles.

3.12 Control and Alarm Requirements

3.12.1 Process Monitoring

The MSWI shall have a fully integrated control system that will allow a single operator to identify the status of every active component at all times from a single location. The system may have slave and/or remote panels, but all process and condition parameters shall be displayed at a single operator station. The control panel shall be housed in a NEMA 4X or IP65 stainless steel enclosure, and its size shall be of the minimum volume required to house and allow for maintenance of components. From this control panel the operator shall be able to energize and de-energize all components individually (on/off/auto switching). The control panel shall include a main disconnect switch or circuit breaker that is capable of being locked with three padlocks simultaneously to suit NEC and shipboard tag out requirements. All branch circuits shall be protected using circuit breakers instead of fuses. The number of circuits less than 2 amps shall be minimized and may be protected using fuses. All programmable devices must be able to be re-programmed with the electrical enclosure door closed. An external plug or receptacle with watertight cover, or an external watertight access door shall be provided. If a Programmable Logic Controller is used, it shall contain an Ethernet connection with an external plug or receptacle.

The control system shall automatically control the start-up, processing, shut down (normal and emergency) at the operators command. The control system shall provide sufficient process monitoring and automated controls to maintain controllable, stable, safe and non-destructive operating conditions. Set points shall be set for temperatures, pressures, feed rates, O_2 level or any other parameters required by the MSWI manufacturer to control the destruction process to meet the exhaust gas requirements described in section 3.11.1. The manufacturer shall provide all sensors, analyzers, and actuators needed to perform all control functions. The MSWI control/operator interface shall clearly communicate only the information to the operator that is required to ensure efficient and safe operation of the MSWI process (see section 3.12). An additional control panel interface accessible only by password control or key-lock shall provide the maintenance personnel (see section 3.16) with detailed status information on all components, system maintenance requirements, predictions of potential component failures and clear identification of failure and where in the technical manual to turn for troubleshooting and effecting repair.

3.12.2 Alarms

The system shall provide warnings and alarms for any operating condition that results in the MSWI exceeding acceptable operating conditions, including those that require action by the operator. These include, but are not limited to, high destruction chamber temperatures, improper exhaust draft, or loss of seawater. Each individual alarm shall have only a single cause to expedite troubleshooting (for example, “flame failure” alarm, not “auxiliary burner failure” alarm).

3.12.3 Fail-Safe and Emergency Shut Down

The system shall provide for an automatic fail-safe shut down capability for any operating condition that may result in damage to the system, or endanger the ship or personnel. The system shall prevent damage to the operator or equipment during the sudden and total loss of any one or more services and during emergency shutdown. Provision shall be made for remote external Emergency Stop Control Switches, to immediately shut down that component and initiate an entire MSWI shutdown. These switches shall be located in various locations in all MSWI spaces (such as next to the feed hopper, on the control panel, outside the compartment door, etc). Emergency shutdown shall be a controlled shutdown to minimize cleaning/maintenance prior to the next start up, but must shutdown fast enough not to cause a hazardous condition to personnel or equipment. Alarm conditions that do affect the safety of equipment or personnel shall use this shutdown sequence.

3.12.4 Guards and Safety Interlocks

Guards shall be provided to prevent operator contact with rotating or moving parts, hot surfaces, or other hazards. The guards shall be designed so that they cannot be removed without the use of tools. Safety interlocks and locking mechanisms shall be provided to ensure that while the MSWI is in operation, the operator cannot access any area of the MSWI that can cause harm to either operating personnel or equipment. The interlock and/or locking devices shall be resistant to damage from accidental impact from hand-carried objects, shock loading and compromise (i.e. they shall not be easily over-ridden by an individual wanting to compromise them). Interlock locking devices/latches shall not require adjustment and shall be able to withstand shock loads without damage or compromise.

3.13 Electrical Systems

The MSWI electrical systems shall comply with IEEE 45-1998. The electrical systems shall be designed to minimize radiated and conducted electrical emissions and shall not be susceptible to electrical fields. For example, radiated emissions shall be less than 36 decibels above 1 micro-volt/meter at 100 MHz (measured at 1 meter from the equipment). Also shipboard solid waste equipment shall not be susceptible to electrical fields up to 10 Volts/meter. The electrical cables to be used shall be of the low smoke type. The ship’s power to be supplied to the system will be 440V - 60 Hz, 3-phase, 3-wire, ungrounded as specified in MIL-STD 1399. Supplied power will be in accordance with IEEE 45-1998. All motors shall use 440V - 60 Hz, 3-phase electrical power. System controls and sensors may use 12VDC, 24-30VDC, or 120 VAC. The contractor shall provide transformers and/or regulated power supplies to create this power from the 440VAC inlet power.

3.14 Piping Systems

All piping in the system shall be designed and installed in accordance with the requirements of MIL-STD-777E, Standard Practice for Selection and Application of Piping System Materials. All pipes shall be welded and shall use flanges where disassembly is required or where the pipe connects to the ship services.

3.15 Equipment Life, Reliability and Maintainability

3.15.1 Life Expectancy

The MSWI shall be designed and constructed to provide a 25-year operational life with a minimum of maintenance and repair. The reliability and maintainability characteristics of the thermal destruction system shall ensure that the crew of a U.S. Navy aircraft carrier or other large combatant can, with a high degree of confidence, consistently dispose of the target waste stream, as defined in section 3.7, for a 7 month underway deployment. It is noted that a single MSWI can not process the entire quantity of waste generated each day.

A NIMITZ Class Aircraft Carrier 18 month operational cycle can be broken down as follows:

- 7 month deployment (includes a full crew and an estimated waste generation rate of 17,700 lbs./day of waste for seven days a week)
- 6 month yard period (very little MSWI use, the MSWI is available for inspection and maintenance)
- 5 months limited deployments and work up period (includes a partial crew and approximately 50% of the 17,700 lbs./day generation rate)

3.15.2 Cleanliness

The system shall be designed to facilitate the ease of cleaning and minimize manpower requirements and life cycle costs while insuring the safety of the ship's personnel who are performing the cleaning procedures. The creation of inaccessible, hard to clean areas shall be avoided. Areas that collect waste, debris or water shall be avoided in the design. Automated rinsing systems shall be provided as appropriate.

3.15.3 Reliability Requirements

The design of all components shall be consistent with an at sea working environment. The MSWI system shall have a Mean Time Between Critical Failures (MTBCF) of greater than 7 months of daily operations at the required capacity (MIL-HDBK-781). A critical failure is defined as one that requires the MSWI to be non-available for service for a time period that prevents processing of two day's waste.

3.15.4 Maintainability

The contractor shall provide one set of all special tools needed for the operation and maintenance of the system (under the Phase III contract). The following repair times shall be calculated (during Phase II) when using standard mechanic's tools and the special tools as needed. Routine cleaning and preventive maintenance shall not require more than one hour per day. For organizational level corrective maintenance, the MSWI shall have a geometric Mean Time to Repair ($MTTR_g$) of less than four (4) hours 95% of the time and a Maximum Repair Time (M_{max}) of less than twelve (12) hours 95% of the time. Repair times do not include the time required to cool down or heat up the MSWI. Organizational maintenance (i.e. maintenance performed by ship's crew) shall include any maintenance required during ship deployments, which are up to 7 months in duration. Organizational maintenance shall not require skills beyond that which is expected of a 19-year-old enlisted sailor with 32 hours of training. All other maintenance required to maintain function for the 25-yr. life expectancy shall be performed by an intermediate level maintenance organization. Intermediate level maintenance is to be performed by trained government repair specialists or contractors and is to include the replacement of combustion chamber liners and any other major maintenance required to ensure safe and reliable operation for a 7-month deployment. The contractor shall conduct a reliability, maintainability and availability analysis. The

following formulas are to be used to generate $MTTR_g$ and M_{max}. For 'n_c' maintenance tasks, MTTR is the nth root of product of m maintenance tasks. For both formulas shown, n_c is the number of maintenance tasks, x_{ci} is the time to perform the i^{th} maintenance task and the maintenance time shall include all anticipated repairs that would be conducted by ships' force. In the formula for M_{max} the 95^{th} percentile calculation shown below shall be used. In the M_{max} formula, all summation signs are based on a summation with 'i' ranging from 1 to n, which is the number of maintenance tasks.

$$MTTRg = \sqrt[n_c]{x_{ci} * x_{ci+1} * x_{ci+2} \ldots * x_{cn}}$$

$$M_{max95} = \left(\frac{\Sigma \ln(X_{ci})}{n_c}\right) + 1.645 \sqrt{\frac{\Sigma\left(\ln(X_{ci})^2\right) - \frac{\Sigma \ln(X_{ci})^2}{n_c - 1}}{n_c - 1}}$$

3.15.5 U.S. Navy Ship Material Compatibility

The materials used to fabricate the MSWI shall be compatible with the Naval/marine environment, including the salt-water environment, ship structural vibrations up to 40 Hz, and ambient temperatures of up to 120°F (49°C). The shipboard environment includes salt laden mist and condensation entering from compartment ventilation, fresh or salt-water if used in the shock cooling process, and the waste components and their resulting combustion products (for example, sulphur in the waste is converted to SOx/H2SO4). An analysis shall be conducted to ensure the materials of construction selected are shipboard compatible.

3.15.6 Service Life

Refractory materials, if used, shall have a life expectancy of at least 10 years. Materials used in parts that are to be replaced on a preventative maintenance schedule shall have a life expectancy of 150% of that part's scheduled service life. All other materials, including those subject to exposure from the waste being processed, or to the gases and liquids formed from the MSWI process, shall have a service life of at least 25 years.

3.15.7 Paints and Coatings

No chrome or lead paints shall be used. Paints and coatings used shall be suitable for a marine environment, and shall be on the Qualified Products List for shipboard use. Abrasive blast surface preparation shall be in accordance with SSPC-SP10 or NACE standard No. 2 to a maximum profile depth of 1.5-2.5 mils. Paint shall be applied within 4-hr. of surface preparation with VOC compliant paint to a dry film thickness of 4-6 mils. The adhesion between the primer and topcoat shall be tested by using the ASTM D-4541 procedure. This test shall be performed by using a portable adhesion tester or the ASTM D-3359 cut tape test. Components that are made from materials that are compatible with the shipboard saltwater environment (Hastelloy C-276, Inconel, titanium, and other metals (approved on a case by case basis)) may be left unpainted. No elastomers (rubbers and plastics) shall be painted, unless painted in accordance with manufacturer's instructions. Fiber reinforced plastics shall be provided with coatings inside and out as specified by the manufacturer for the service intended.

3.16 Human Engineering

The MSWI shall conform to human engineering principles to the degree that it can be operated and maintained by a 5-ft (152-cm) tall male or female as well as 6-ft 1-in. (185-cm) tall male or female. Its design shall also reflect system and personnel safety factors, including the elimination or minimization of the potential for human error during operation and maintenance, under both routine and non-routine or emergency conditions. Machinery, systems, equipment, and fixtures shall be intrinsically safe as far as practicable, and in the event of failure, shall fail to a safe mode. Man-machine interfaces shall minimize both the potential for and the consequence of human error. The system shall be designed assuming a 19-year-old operator who has been provided with four hours of interactive MSWI computer based training (delivered on Compact Disc) and no more than four hours of MSWI on-the-job training. The system shall be designed to be maintained at the organizational level by a 19-year-old sailor with 8 hours of MSWI interactive courseware training plus 24 hours of MSWI on-the-job-training (total of 32 hours of training). A human engineering analysis to ASTM F1166-95 shall be conducted (during Phase II) to ensure there are no unresolved issues.

3.17 Manning

The manpower required to operate, maintain, clean and repair the MSWI shall be no more than 48 man-hours per day. In addition, the following equipment must be manned when in operation: Shredders, pulpers, ash transfer systems, and the destruction system (while waste is being consumed). The vendor shall propose, subject to Government approval, the types and hours of manpower necessary for safe operation and maintenance of the system.

3.18 Consumables

The system design shall limit the use of consumables. The manning, cost, risk, space and weight to manage all consumables will impact system suitability. The usage requirements (how much, cost, how frequently, technical difficulty in using, criticality in using correctly, etc.) and the storage requirements (size, volume, weight, special storage and handling requirements, etc.) must be clearly defined and documented. Any materials will have to be shipboard approved.

3.19 Airborne Noise

Airborne noise in occupied compartment(s) shall meet the noise limits recommended in SNAME T & R Bulletin No. 3-37 that provides design guidance on shipboard airborne noise control.

3.20 Shock and Vibration (Phase II)

The system shall be free from vibration that could result in damage or the potential of damage to the ship structure, machinery, equipment, and systems, or interferes with the operation of the ship, its cargo systems, or any ship component.

For protection from ship-induced vibration, a computer generated Finite Element Analysis shall be performed for all of the MSWI system components. The system shall meet the following requirements; no resonant frequencies below 40 Hz, meet ISO 6954 requirements, NAVSEA 0908-LP-000-3010, Rev1, and meet MIL-S-901 for Grade B Shock. Computer generated analysis shall include discussion of the finite elements used, method of modeling the brittle refractory, discussion of the boundary conditions, loading conditions used, and computer generated drawings of the un-deformed and deformed mesh, and boundary and loading conditions as placed on the model. The Class B loading condition is classified and must, therefore, be performed by a contractor or government organization cleared for classified work. Shock/vibration isolators may be used to help in meeting these requirements.

The fuel and electrical system are required to meet MIL-S-901 for Grade A shock. It is anticipated that the system will be provided with a Grade A shock qualified MIL-SPEC shunt

trip breaker, emergency stop switch, day tank, and fuel valves by the installer. The circuit breaker shunt trip would be connected to the emergency stop switch via a 440 VAC circuit that is separate from the incinerator controls. Upon loss of power, the fuel valves will spring return to the closed position, preventing fuel leakage from the day tank. The manufacturer shall provide a 120 VAC circuit from the incinerator control panel through a set of contacts on the emergency stop switch to open the fuel valves to supply fuel to the incinerator. Therefore the emergency stop push button will trip the breaker and interrupt power to the fuel valves directly. The emergency stop switch will have a third set of contacts to break a circuit to the incinerator controls to shut down the incinerator.

3.21 Safety

3.21.1 Emergency Requirements.

Loss of any ship supplied service listed in section 3.4 or failure of any MSWI component shall not cause damage to the MSWI system including exhaust ducting. Note: a bypass stack, a backup quench of fresh water or air can be used to prevent system damage; however, these systems shall not be used during normal operation. Also, routing of the bypass stack will be restricted by ship structure and configuration and must have an exit temperature of less than 400 deg F. See also Section 3.12.3 Failsafe Operation.

The MSWI shall be safe under both normal and unplanned conditions in accordance with the requirements of MIL-STD-882 and MIL-STD-1629). For the study (during Phase II), a Failure Modes, Effects, and Criticality Analysis (FMECA) shall be performed to evaluate the impact and likelihood of all conceivable failures. This shall include as a minimum, failures of all MSWI components from shock, vibration, electro-magnetic interference, or other possible failure modes, accidental introduction of materials in the feed that are not recommended for processing (including but not limited to items listed in table 4) and loss of any or all services as listed in section 3.3. The term ‘failure’ shall apply to any event with negative consequences to personnel or the equipment, including the potential for waste catching fire outside of the destruction chamber(s) and/or the release of smoke, flame, or noxious gases into the ship’s environment. The following types of failures are not acceptable as part of the MSWI system:

- Catastrophic failures that result in death or system loss and are of remote likelihood to occur.
- Critical failures that cause severe injury, illness, or major system damage and are of probable likelihood to occur.
- Marginal failures that cause minor injury or illness or system damage and are expected to occur frequently.

The following failures shall be minimized to the greatest possible extent:

- Catastrophic failures that are of improbable likelihood to occur.
- Critical failures that are of occasional likelihood to occur.
- Marginal failures that are of probable likelihood to occur.

3.21.2 Forbidden Materials.

No asbestos shall be used in the construction of the MSWI or any subsystem, including gaskets or lagging materials.

In addition barium, cadmium metal, chromium metal/compounds (except plating), lead metal/compounds (except solder), mercury metal/compounds, ozone depleting substances (ODSs) Class 1, polychlorinated biphenyls (PCBs), selenium compounds (except electrical components

and maintenance equipment) and silver metal/compound (except in plating, solder and braze materials) shall not be used anywhere within the MSWI system.

3.21.3 Surface Temperature.

Outside or exposed surfaces which can attain a temperature of 125 degrees F or higher during any service condition shall be insulated wherever necessary to protect personnel, prevent undesirable transfer of heat to the surroundings, or prevent transfer of heat from the component wherever such transfer would be detrimental to operation of the component or system. For maximum fire prevention, exposed surfaces shall always be shielded to prevent oil impingement, where they can attain a temperature of 400 degrees F or higher, and where impingement of a flammable fluid on these surfaces is a distinct possibility. The following guidance shall also be observed:

- Piping and components affixed to the MSWI components or structure shall be of sufficient flexibility to prevent overstressing of components or leakage of joints.
- Piping in proximity to hot surfaces with temperatures above 140?F shall be routed or guarded to ensure that leakage cannot result in oil contacting these hot surfaces. The number of joints shall be minimized through pipe bends rather than elbows; joints shall be welded and tested at 150% of maximum possible operating pressure.
- Piping components and materials shall follow the design guidance described in MIL-STD-777E (SH) and following change notices.
- The use of guards instead of insulation is acceptable where such insulation is detrimental to system operation or maintenance. However, the temperature of all exposed surfaces of the guard shall be below 140F.

3.21.4 MSWI Room Ambient Temperature

The ambient temperature in any compartment(s) where MSWI equipment is installed will be less than 100°F regardless of the temperature outside the ship. The manufacturer shall provide calculations showing the anticipated heat loss from the MSWI under all combinations of the waste composition, when operated at full capacity. The manufacturer shall also identify whether any equipment cannot be used with an ambient temperature of 100°F. Ventilation air and other cooling will be provided by the installer to maintain the compartment temperature at less than 100°F.

3.21.5 Considerations for Operability and Serviceability

Equipment, components and piping/ducting attached to the MSWI shall not restrict access by the operator to the waste inlet and shall not be subject to damage due to a careless operator, who may bump into or climb upon components or piping.

4. DELIVERABLES

4.1 MSWI Design Drawings (CDRL A001 of the DD FORM 1423)

An MSWI production design package shall be produced that details all pertinent aspects of the MSWI manufacture. The ship integration conceptual design shall be developed for two separate ship locations (CVN68 and CVNX classes). CAD Drawings may be created in any drawing program, but shall be submitted as directly readable with no proxy graphics, including solid models, in AutoCAD version 2002, ".dwg" format and in hard copy (Architectural or mechanical ANSI sizes A-E). The drawings shall provide the following information at a minimum:

- Details on the manufacture and assembly of all component parts
- Part numbers and vendors for all commercial parts

- All manufacturing process and details
- Installation control information, including foundation requirements, operational envelope, utility interfaces, weight, center-of-gravity, etc.
- Assembly and sub-assembly details
- Piping and Electrical Schematics
- Control Logic (If the control logic is in a programmable controller, submit a printed copy of the PLC control program and all comments and documentation)
- A drawing tree that shows drawing interrelationships
- Plan and elevation views of the ship compartments showing the location of all major equipment and showing operational and maintenance envelopes, door swings, etc.

4.2 MSWI Design Report (CDRL A002 of the DD FORM 1423)

A detailed report, complete with engineering analysis, shall be provided in order to validate the manufacturer's assessment that their MSWI will process the target waste stream while meeting the requirements described in sections 3.1 through 3.21. The analyses described below must show that the entire targeted waste stream can be processed in a 24 hour time period, minus the times necessary for startup, shutdown and for planned maintenance. The report must also assess the impact of each of the typical incidental items on the MSWI operation and safety, a thermal energy balance and a human engineering analysis. The thermal balance shall include the heat loss from the system to the compartment, including the heat loss from the electric motors. For commercial items, the offeror shall also provide information on the supplier and points of contact at the manufacturer. To better assess the longevity of the equipment in this application, the offeror shall provide information on similar applications where this component is already in use and points of contact for end users.

4.2.1 Planned and Unplanned Maintenance Time Calculation

The report shall first calculate a maximum unplanned maintenance, which shall be defined as the 95th percentile of corrective repair times ($M_{max95}$with 95 percent confidence). The maintenance tasks used to calculate M_{max95} shall include all anticipated repairs that would be conducted by ships' force. The following calculation shall be used, with $\ln(X_{ci})$ being the natural log of each maintenance time and n_c being the number of maintenance tasks:

$$M_{max95} = \left(\frac{\Sigma \ln(X_{ci})}{n_c}\right) + 1.645 \sqrt{\frac{\Sigma\left(\ln(X_{ci})^2\right) - \frac{\Sigma \ln(X_{ci})^2}{n_c - 1}}{n_c - 1}}$$

For this calculation, the maintenance times shall include one hour for acquisition of any spare parts. The total preventative and corrective maintenance time would then be calculated as the sum of M_{max95} and daily planned maintenance time.

4.2.2 Daily Operating Time

The daily operating time shall be calculated by subtracting the following times from a 24-hour period:

- Estimated startup and shutdown times,
- Waste burn down time (if required),

- Ash removal downtime (if required), and
- The maximum single day preventative and corrective maintenance times calculated in paragraph 4.2.1.

4.2.3 Acceptable Processing Rate

The acceptable processing rate shall be calculated as the amount of the targeted waste stream divided by the daily operating time. A detailed analysis shall then be performed to validate that the MSWI is capable of reliably processing the entire target waste stream within each 24-hr. period, including downtime. To the extent possible, calculations shall be based on performance data of an existing MSWI. Calculations shall take into account incineration inefficiency due to known factors such as the changing heat values of the in-feed and varying material size and shape.

4.2.4 Maintainability and Reliability Calculations (Phase II only)

The report shall contain a reliability, maintainability and availability analysis. Calculations shall be provided to assess the MSWI systems MTBCF, $MTTR_g$, and M_{max} against the requirements of section 3.15. Where possible, calculations shall be based upon actual maintenance and reliability data.

4.2.5 Shock and Vibration (Phase II only)

A shock and vibration model and its analysis shall be provided, including an electronic computer and printout copy of the finite elements, to show that the MSWI system does not have any resonant frequencies below 40 Hz. The model shall include all system components, sub components, structure, and piping. The use of bolted structural joints shall be minimized, and all bolted joints shall be included in the model. An assessment of the MSWI's resistance to shock shall also be provided. This shall include the level of shock at which the MSWI structure is subject to releasing flying debris.

4.3 MSWI Demonstration Test Report (Phase I only)(CDRL A003 of the DD FORM 1423)

A detailed report, complete with the raw data and data analysis, shall be provided in order to validate the performance of the incinerator system during the demonstration test. The report shall clearly indicate the rated capacity of the system tested, the actual capacity during testing, and the projected capacity of the Phase I design system with the tested waste streams.

4.4 MSWI Safety Report (Phase II only) (CDRL A004 of the DD FORM 1423)

A safety assessment report shall be provided to analyze the MSWI's safety in accordance with section 3.21. It shall be prepared in accordance with MIL-STD-882 and MIL-STD-1629. The report shall include a failure modes, effects, and criticality analysis (FMECA) that addresses all conceivable failures, both of MSWI equipment and ship services, and assesses the results of such failures, including their severity and probability of occurrence.

4.5 MSWI Compliance Report and Presentation (CDRL A005 of the DD FORM 1423)

A summary report shall be prepared and a presentation of its conclusions shall be made to the Government to describe how the planned MSWI design will comply with all requirements detailed in section 3. For any requirement that may not be fully met, the contractor shall detail why not, and explain how the problem will be mitigated. If a waiver is requested, the reason and expected consequences of the waiver shall be clearly stated. For Phase I, this report shall also include the proposed plan including the name and experience of the

proposed subcontractor needed to provide the shock, vibration, safety and reliability analyses for Phase II.

4.6 MSWI Cost Estimates (CDRL A006 of the DD FORM 1423)

4.6.1 MSWI Cost Estimate Number 1. (Phase I only)

This cost estimate is for the modification of the design to meet all of the requirements in section 3 during Phase II.

4.6.2 MSWI Cost Estimate Number 2. (Phase II only)

This cost estimate is for the purchase of one (1) first article MSWI for Phase III. This includes the system hardware and software, all ship interface hardware, technical documentation, installation support via teleconference, complete commissioning (on-site) including cure of the refractory and thorough start up testing, 40 hours of training, a training video, spare parts for one year, 120 hours of remote post delivery technical support and 80 hours on site technical support.

4.6.3 MSWI Cost Estimate Number 3. (Phase II only)

This cost estimate is for the purchase of two (2) production MSWIs per year for 5 years for Phase IV. This includes the system, all ship interface hardware, technical documentation, 2 copies of the training video, spare parts for one year (per system), 240 hours of remote post delivery technical support per year and 160 hours on site technical support per year.

4.7 Meetings and Visits (CDRL A007 of the DD FORM 1423)

Bi-Weekly teleconferences with the contractor and manufacturer(s) shall be held. One meeting at the site of the demonstration test (phase I only) or at the contractor's site (Phase II only) and one meeting at the Government's facility (for both Phase I and II) shall also be held. The contractor shall record minutes of the meeting discussions, project status, and outstanding issues. The minutes shall be provided in electronic report format using Microsoft Word 2000 no later than 5 days after the teleconference.

5. Proposal Requirements

The following items are to be submitted as the proposal for this solicitation:

1. Description of the proposed Phase I COTS incinerator system:

    a. Table of Incinerator Characteristics, see below. All items should be completed, with "N/A" for any items that are not applicable to the design.

    b. Catalogs, Photographs, and Drawings of systems similar to the proposed Phase I COTS incinerator system (limit 10 pages).

2. Discussion of Technical Understanding and Approach (limit 5 pages)

    a. How the Phase I COTS incinerator meets the specification.
    b. List of the specification sections that the Phase I COTS incinerator does not meet the requirements.
    c. The approach that will be taken under Phase II to meet all of the specification requirements.
    d. The contractor's/manufacturer's capability to modify the design to strengthen it to meet the Navy's shock and vibration requirements.

e. The contractor's/manufacturer's ability to provide the Demonstration Test of a similar incinerator using Navy waste.

3. Summarize your experience in the following areas (limit 5 pages)

   a. Providing equipment to the US Navy, especially for combatant ships.
   b. Providing incinerator systems for salt-water environments (shipboard, barge, drill rig, port, etc.).
   c. Designing and building incinerator systems for high heat waste.
   d. Emissions tests or certifications of previous systems.

4. References of 5 recent projects for the US Government. If the bidder was not the prime contractor, also include the contact information for the prime contractor. The following information is required (limit 5 pages):

   a. Government Agency
   b. Project
   c. Government Contact Name
   d. Government Contact Phone Number
   e. Project Start and End Dates
   f. Equipment and Services Provided

5. Cost Proposal (sealed in a separate envelope) (limit 2 pages)

   a. Fixed cost for the Phase I COTS incinerator design.
   b. Fixed cost for the Demonstration Test.

Table of Incinerator Characteristics (Page 1 of 2)					
Capacity (Million btu per day)					
Capacity (pounds per hour)					
	Length	Width	Height	Weight	Power
Overall Dimensions (length x width x height (inches))					
Automatic Feed System					
Type of Feeder					
Size of Opening (length x width (inches))					
Maximum dimension of waste (length x width x height (inches))					
Type of airlock between the operator and the chamber					
Method of Controlling the Feed Rate					
Shredder (if used)					
Conveyors (if used)					
Other Feed Equipment (list if used)					
Ash Removal System					
Type of Mechanism					
Ash Container Dimensions (inches)					
Method of Controlling Fugitive Dust					
Other Equipment (list if used)					
Auxiliary Equipment (if used)					
Hydraulic Power Unit					
Central Air Fan					
Compressed Air Conditioning Equipment (dryer, filter, etc.) (list)					
Exhaust Gas System					
Quench Type (wet/dry)					
Wet Quench Fresh Water Flow Rate (gallons per minute)					
Wet Quench Salt Water Flow Rate (gallons per minute)					
Wet Quench Drain Flow Rate (gallons per minute)					
Draft System (Induced Draft Fan/Draft Inducer/Other)					
Draft Control Method (Modulating (Damper/Modulating Fan/other), Fixed (Manual))					
Exhaust Gas Flow Rate at Standard Conditions (cubic feet per minute)					
Exhaust Gas Duct Diameter (inches)					
Other Exhaust Gas Equipment (list each)					

Table of Incinerator Characteristics (Page 2 of 2)				
Thermal Destruction Chambers	Primary	Secondary	Tertiary	Duct to Quench
Chamber Volume (cubic inches)				
Chamber Dimensions (length x width x height or length x diameter (inches))				
Chamber Auxiliary Burner Capacity (btu per hour)				
Chamber Burner Controls (Modulating/Multi-Position/On-Off)				
Chamber Combustion Air Flow (cubic feet per minute)				
Chamber Air Controls (Modulating (Automatic)/Fixed (on-off))				
Chamber Refractory Service Temperature (Degrees F)				
Chamber Refractory Thichness (inches)				
Chamber Insulation Service Temperature (Degrees F)				
Chamber Insulation Thichness (inches)				
Chamber Insulation Type				
Chamber Structural Shell Thichness (inches)				
Chamber Air Gap (if used) (inches)				
Chamber Outer Shroud Thickness (if used) (inches)				
Chamber Retention Time (seconds)				
Primary Chamber Hearth Loading (lb/hour/square foot)				
Chamber Heat Loading (btu/hour/cubic foot)				
Control System				
Type of Temperature Sensors (list)				
Type of Flow Meters (list)				
Type of Pressure Sensors (list)				
Control Voltages (list)				
Variable Frequency Drives (yes/no) (list brand/model number)				
Programmable Logic Controller (yes/no) (list brand/model number)				
Electronic Display (yes/no) (list brand/model number)				
Utility Usage				
Fuel (kerosene) to Preheat the Chamber from a Cold Start (gallons)				
Fuel (kerosene) during normal operation (gallons per day)				
Electricity (kW at 440V/3ph/60Hz)				
Fresh Water (gallons per day)				
Salt Water (gallons per day)				
Compressed Air (total) (standard cubic feet per day)				
Compressed Air Maximum Usage Rate (standard cubic feet per minute)				
Combustion Air Rate (total for all parts) during normal operation (cubic feet per minute)				
Consumable Parts (expected life less than 24 months of daily use) (list)				
Heat given off by the equipment into a 32 degree Farenheit room (btu/hour)				
Surface Temperature (degrees Farenheit)				
Noise (dbA)				

6. Evaluation Factors (Best Value Evaluation)

The contract resulting from this solicitation will be awarded to that responsible offeror(s) whose offer, conforming to the solicitation, is determined most advantageous to the Government, cost/price and other factors considered. The offeror's proposal shall be in the form prescribed by this solicitation and shall contain a response to each of the areas identified that affects the evaluation factors for award.

The proposal will be evaluated as a whole, independent of the portion of work being performed by each member of the offeror's team or subcontractors. However, the proposal must demonstrate that the technical approach and past experience of the team or subcontractor arrangement, will be successful.

Proposals which are unrealistic in terms of technical or schedule commitments or unrealistically high or low in cost may be deemed reflective of an inherent lack of technical competence, or indicative of a failure to comprehend the complexity and risks of the proposed work, and may be grounds for rejection of the proposal. If the proposed contract requires the delivery of data, the quality of organization and writing reflected in the proposal will be considered to be an indication of the quality of organization and writing which would be prevalent in the proposed deliverable data. Subjective judgment on the part of the Government evaluators is implicit in the entire process. Throughout the evaluation, the Government will consider "correction potential" when a deficiency is identified.

The basis for award of a contract(s) as a result of this solicitation will be an integrated assessment by the Contracting Officer of the results of the evaluation based on the evaluation factors and their importance as indicated below. Ultimately, the source selection decision will take into account the offeror's capability to meet the requirements of this solicitation on a timely and cost effective basis. The Government reserves such right of flexibility in conducting the evaluation as is necessary to assure placement of a contract in the Government's best interest. Accordingly, the Government may award any resulting contract to other than the lowest priced offeror, or other than the offeror with the highest evaluation rating. In addition, the Government reserves the right to not award any contracts if the proposals do not demonstrate that the offerors will be successful or if the Navy's needs change.

This contract will be awarded to the responsible offeror whose offer conforms to the solicitation, and will be most advantageous to the Government, price and other factors considered, as provided for in the Federal Acquisition Regulation (FAR) 52.215-16. "Other factors" shall include all of those evaluation factors that are described in this section.

As allowed by the provision FAR 52.215-1, INSTRUCTIONS TO OFFERORS--COMPETITIVE ACQUISITION (OCT 1997), in Section 5 of this solicitation, the contract award may be made on the basis of initial offers received without discussions. Consequently, a proposal submitted in response to the solicitation should contain the offeror's best product in terms of technical content and cost realism and reasonableness. However, after evaluations are completed, if award cannot be made on the basis of initial offers, discussions will be conducted only with those offerors determined to have a reasonable chance for award.

Major Evaluation Factors and Subfactors and Their Degree of Relative Importance are as follows (listed in **Descending** Order of Importance):

I. Mandatory Requirements
II. Past Performance

III. Technical Understanding and Approach
IV. Price

Factor II and Factor III are of equal importance and both are more important than Factor IV.

6.1 SECTION I - MANDATORY REQUIREMENTS

The following are mandatory requirements. Failure to meet any of these requirements will render the vendor's proposed system technically unacceptable. If the vendor's proposed system is deemed technically unacceptable the vendor's proposal shall be removed from further consideration. The mandatory requirements are as follows:

- The contractor must be able to provide the Performance Test of the COTS incinerator to demonstrate the capability to burn all of the Navy waste mixtures.
- None of the components of the Phase I COTS Incinerator system may have a height greater than 7-ft, 6-in.
- The weight of the Phase I COTS Incinerator system must be below 40,000-lb.
- Forbidden materials cannot be used.
- The exhaust quality, must meet the requirements described in Table 5, Section C.
- Discussion on all five of the proposal elements must be provided.
  - Past Performance
  - Technical Capabilities and Documentation of how the proposed Phase I COTS incinerator meets the requirements in the statement of work.
  - Technical Approach to Modify the COTS Incinerator
  - How the demonstration test will be performed.
  - Cost for the Phase I COTS Incinerator design and the cost for the demonstration test (MUST be provided in a separate sealed envelope with no cost information in the technical proposal.

6.2 SECTION II - PAST PERFORMANCE

The offeror's proposal shall be evaluated on the demonstrated quality of past performance in the following five areas with subfactors a, b, c, and d, are equal, and are more important than item e:

a. Customer Satisfaction
b. Quality of Product
c. Schedule Adherence
d. Cost Control
e. Contract Compliance including with 52.219-8

Past performance is required by FAR Part 15 to be used to assess the relative merit among proposals. The Government will evaluate the offeror's reputation for conforming to specifications and to standards of good workmanship, for accurately estimating and controlling costs, for adherence to contract schedules (including administrative aspects of performance), for reasonable and cooperative behavior and commitment to customer satisfaction, and for having a business-like concern for the interests of the customer. Be advised that the Government may not contact all references or may seek/contact other references. Offerors with no past performance will not be evaluated favorably or unfavorably on past performance. For the particular offeror who lacks past performance history, the relative standing among offerors is based upon all other evaluation factors except past performance. Proposals will be given credit for good past performance, lose credit for poor past performance, and neither receive nor lose credit for no past performance.

Assessment of the offeror's past performance will be one means of evaluating the credibility of the offeror's proposal and relative capability to meet performance requirements. Information may be obtained from the references listed in the proposal, and other customers known to the Government who may have useful and relevant information. Information will also be considered regarding any significant subcontractors. Evaluation of past performance will be based on consideration of all relevant facts and circumstances. The Government intends to award on initial offers received without discussions. However, if discussions are held, offerors will be given an opportunity to address unfavorable reports of past performance, if the offeror has not had a previous opportunity to review those reports.

6.3 SECTION III - TECHNICAL UNDERSTANDING AND APPROACH

The technical ability to provide an incinerator that meets all of the requirements of the statement of work is the ultimate requirement for this program. The procurement is being made in several phases to reduce the risk that the offeror can meet all of the requirements when the Phase III and IV contracts are awarded. Proposals that are incomplete or fail to describe the understanding of all of the requirements will be deemed non-responsive and the offeror will be excluded from consideration under all phases. All subfactors are of equal importance.

6.3.1 COTS System.

The offeror’s proposal will be evaluated on how its proposed Phase I COTS incinerator system meets the requirements in the Statement of Work as described in the Table of Incinerator Characteristics; Catalogs, Photographs and Drawings; and the Discussion of the Phase I COTS Incinerator System (including the list of specification sections that the Phase I system does not meet). Discrepancies between these parts of the proposal or missing information will reduce the score.

6.3.2 Phase II Requirements.

The offeror’s proposal will be evaluated on how it proposes to modify the Phase I COTS incinerator system design to fully meet the requirements in the Statement of Work for Phase II. The offeror’s plan to meet the analysis requirements for shock, vibration, reliability, and safety is an important part of this item. Discrepancies between these parts of the proposal or missing information will reduce the score.

6.3.3 Demonstration Test.

The offeror’s proposal will be evaluated on how it proposes to conduct the Demonstration Test of a similar incinerator using the Navy waste mixtures.

6.4 SECTION IV - PRICE EVALUATION

Section 5 requires the costs is to be provided as two fixed price items. The payment for each will be made upon the full completion of that item. There are no down payments, progress payments or other partial payments under the anticipated contract.

Proposed prices will be evaluated on the basis of reasonableness in conjunction with the performance risk evaluation, for the purposes of guarding against unrealistically low prices which can lead to quality deficiencies, late deliveries, or performance shortfalls. To that end, if an offeror has chosen to make a management/business adjustment to its pricing, it must be clearly identified in the price proposal.

The Government may reject an offer as unacceptable if it is materially unbalanced as to prices. An offer is unbalanced when it is based on prices less than the cost for some work and prices that are significantly overstated for other work. Evaluating the contract option price will not obligate the Government to exercise said option. Offerors are advised to submit a proposal that is fully and clearly acceptable without requiring additional explanation or information.

Offerors are required to quote all CLINs. Failure to provide prices for all CLINs may result in the proposal being rejected. The proposed prices, including the price of the option item, will be evaluated for reasonableness in accordance with 15.404-l(b). Essentially, a price is reasonable, if, in its nature and amount, it does not exceed that which would be incurred by a prudent person in the conduct of competitive business.

6.4.1 Price Reasonableness.

The costs shall be evaluated for reasonableness to determine the overall probable price to the Government in fulfilling all of the requirements under this solicitation. The purpose of the evaluation is to (1) verify the offeror's understanding of the requirements; (2) asses the degree to which the cost proposal reflects the approaches and/or risk that the offeror will provide the services for the offered costs; and (3) assess the degree to which the cost included in the proposal accurately represents the work effort included in the technical proposal. Proposed costs may be adjusted, for the purposes of evaluation, based on the results of the cost realism evaluation. Unrealistic prices will be considered in the risk assessment and may result in a reduced technical score.

6.4.2 Final Proposal Revisions.

In accordance with the provision at 52.215-1, "Instructions to Offerors - Competitive Acquisition (Oct 1997)" of this solicitation, the Government intends to evaluate proposals and award a contract without discussion with offerors. Therefore, the offeror's initial proposal should contain the offeror's best terms from a cost or price and technical standpoint. If the provision at 52.215-1 is used with its Alternate I, the Government intends to evaluate proposals and award a contract after conducting discussions with those offerors whose proposals have been determined to be in the competitive range. However, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals. Therefore, the offeror's proposal should contain the offeror's best terms from a price and technical standpoint.

6.4.3 Importance of Price.

The importance of price as an evaluation factor will increase with the degree of equality of the proposals in relation to the remaining evaluation factors.

Note: Offerors are advised that a determination of unacceptability in any single area indicated above may render the entire proposal unacceptable. THE TECHNICAL PROPOSAL SHALL CONTAIN NO COST INFORMATION.